Saving Lives at the Tip of the Spear™

THROWBOT XT

KNOW BEFORE YOU GO®

Throwbot XT User Manual

Version 1.14 July 2015

RECON ROBOTICS™

R001108

Product Identification

This manual applies to the ReconRobotics Throwbot® XT and OCU II.

Notice:

Changes or modifications not expressly approved by ReconRobotics could void the user's warranty and could void the user's authority to operate the equipment.

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Place Serial Number Sticker Here

The devices described within this manual are protected under US Patent Numbers 6,548,982, 6,806,346, 7,559,385 and other patents pending.

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For applicable FCC guidelines, refer to your FCC logbook (US customers only).

Throwbot XT Kit Inventory

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Please inspect the contents of this package to ensure that all materials are present.

If any of the materials are missing, please contact support@reconrobotics.com.

Your Throwbot XT Kit includes:

- One (1) Throwbot XT or Throwbot XT Audio Robot
- One (1) Operator Control Unit (OCU II) with lanyard
- One (1) Throwbot XT & XT Audio 4-Pin AC Dual DC Battery Charger
- One (1) Region-Specific AC Power Cable
- One (1) Spare Activation Pin
- One (1) Tether Kit
- One (1) Volume Control Adaptor (with Throwbot XT Audio only)
- One (1) Pelican® Carrying Case
- One (1) User Manual

Double Throwbot XT Kits include:

- One (1) Additional Throwbot XT or Throwbot XT Audio Robot
- One (1) Additional Activation Pin

Throwbot XT Robot Components

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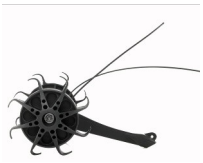
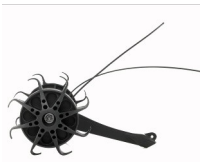
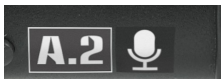
A robot should have the following components:

	Throwbot XT	Throwbot XT Audio
Two Antennas		
Activation Pin		
Two Wheels		
Stabilizer Tail		
IR Blister		
Water Resistance	Passively water resistant to a depth of one foot (30cm) for five minutes	Passively water resistant to a depth of one foot (30cm) for five minutes
Microphone	Not Active	

If any of these items are missing or damaged, please notify ReconRobotics immediately. (See Warranty and Repair, pg. 17)

OCU II Components

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An OCU II should have...

	OCU II
Two Antennas	
Lanyard	
Power Switch	
Headphone Jack*	
Audio/Video-Out Jack*	
Charging Port	

*Audio reception is only available with audio-enabled robots (Throwbot XT Audio), and A/V out signal is only available with A/V cabling package.

OCU II Audio/Video-Out Capabilities

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Audio Output

The OCU II is capable of receiving audio transmitted from the Throwbot XT Audio robot. To listen, plug the provided volume control adaptor into the appropriate jack on the left-hand side of the OCU II. Then plug headphones into the volume control adaptor. Headphones approved for Apple or Android devices will not work with the provided volume control adaptor.

Ensure you are using headphones with in-line volume control. There is no volume control on the OCU itself. Be careful to test the audio volume before using.

Audio/Video Output

The ReconRobotics Audio/Video (A/V) Out Cabling Package (sold separately) can be used to connect the OCU II to an external monitoring/recording device (not included). The A/V Out jack is located on the left-hand side of the OCU II.

Once connected to the OCU II, connect the other end of the A/V Out cable to the appropriate connector on an external device. Please refer to the instruction card provided with the A/V Out Cabling Package for more information.

Do not use third-party cables with the A/V Out jack on the OCU. They will not work properly.

The A/V Out cables in the A/V Out Cabling Package are specially designed to work with the OCU II. Though they may look similar, cables manufactured by a third party will not work appropriately with the OCU II.

Video Only Output

If your robot does not have the capability to transmit audio, you will still be able to output a video signal through the A/V Out jack using the appropriate cable. Do not use headphones with the OCU II unless you are controlling a Throwbot XT Audio robot.

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Operational Specifications

- Range: up to 100 feet (30 meters) indoors or non-line-of-sight, 300 feet (91 meters) outdoors within line-of-sight
- Battery run time on full charge:
  - Robot = 60 minutes
  - OCU II = 120 minutes
- Robot Speed: 1.5 feet (0.46 meters) per second
- Radio Transmission: Analog
- Robot Drop Shock Resistance: 30ft/9.1m vertical
- Robot Throw Shock Resistance: 120ft/36.5m horizontal

Matching Frequency Channels

The operating frequency channel is indicated by a sticker on the robot and OCU II. They must match for successful operation. To deploy multiple robots within the same area of operation, different channels must be used.

When pairing an OCU II and a Robot for operation, the channel designations must match identically. Equipment on channels A.2, B.2, and C.2 is not compatible with equipment programmed to channels A, B, and C.

When operating multiple robot/OCU II systems simultaneously, make sure you are using two robots with different channel letters, for instance A.2 and C. Two robots, one on channel A.2 and one on channel A, will interfere with each other and not work well in the same environment.

Basic Deployment Instructions

1. Charge robot or OCU II if needed.
2. Rotate OCU II antennas to an upright position.
3. Switch OCU II on.
4. Pull pin from robot. Confirm that robot is broadcasting video and accepting command from the OCU II before deploying.
5. If using headphones with a Throwbot XT Audio robot, plug in and test the headphones at a low volume before using.
6. Drop or throw robot into target environment.
7. Wait two seconds after robot lands to allow gyroscope to stabilize before operating.

Instructions for Use: Setup

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Setting up the OCU II

Rotate antennas to an upright position as shown. The operator may rotate the antennas up or down as needed to receive the maximum range performance from the robot system while maintaining a comfortable view of the OCU II screen.

Note

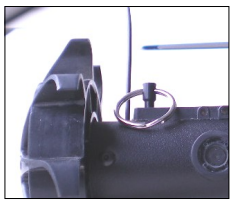
Modification of the antenna system will void your warranty and may violate your FCC authorization to operate this product.

Powering the OCU II

Flip the power switch at the base of the controller from the **Off** to the **On** position.

The screen should light up indicating the unit is ready to use. If the robot is powered on, video from the robot should appear. Otherwise, the screen will display static.

Powering the Robot



- Pull the activation pin from the robot to power it on.
- Reinserting the pin turns the robot off.
- You will hear and feel a click when the pin is fully seated.

Note

When not in use, always ensure the OCU II is switched off and the robot activation pin is inserted.

Instructions for Use: Chargers

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Reading Charge Indicator Lights on Battery Chargers

Your kit may include one or both of these chargers. When plugged into an active power source, the indicator LEDs will display the following charge states:

	AC Dual DC Battery Charger	**BA5590/BB2590 Field Charger***
Green Light	Fully charged OR Not plugged into OCU II/ robot	Fully charged NOTE: LED light may shut off after charging is complete
Red Light	Charging	Charging
No Light	Not receiving power from outlet	Not plugged into OCU II/robot OR Charging is complete (fully charged)
Blinking Light	Charger is connected incorrectly and is not charging the robot/OCU II. Unplug everything and retry (refer to page 8 for instructions).	N/A

*Battery not included.

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Throwbot XT & XT Audio AC Dual DC Battery Charger

1. Turn off OCU II and insert activation pin into robot to deactivate before charging.
2. Plug AC electrical cord into the charger. NOTE: charger **must** be connected to a power source before robot or OCU II for proper operation.
3. Plug AC electrical cord into the proper country-specific AC wall socket (120-240 VAC).
4. Fully insert the appropriate charger cords into the OCU II and robot. *Do not force a connection*; ensure connecting plugs are not bent during insertion or removal. Ensure that the red dot on the connecting plug is aligned with the red line on the robot when inserting (see image at right).
5. Remove robot and OCU II from charger when charging is complete, or keep everything connected to trickle charge and maintain a full battery.

Note **Use caution when inserting the robot charging plug. If the connector piece becomes detached, refer to page 10 for instructions.**

Throwbot XT & XT Audio BA5590/BB2590 Field Charger

1. Turn off OCU II and insert activation pin into robot to deactivate before charging.
2. Plug electrical cord into a 5590 or 2590 battery.
3. Plug the appropriate charger cords into the OCU II and robot. *Do not force a connection*; ensure connecting plugs are not bent during insertion or removal. Ensure that the red dot on the connecting plug is aligned with the red dot on the robot when inserting (see image above).
4. Remove robot and OCU II from charger when charging is complete, or keep everything connected to trickle charge and maintain a full battery.

Note **To prevent battery damage, DO NOT use any chargers not supplied by ReconRobotics. Stop use of charger if contact pins are damaged.**

General Instructions & Recommendations

- Place the chargers in a cool, ventilated, fire-safe area.
- Charge your robot and OCU II at least once per month to ensure the batteries are kept topped off so robot is always ready for immediate deployment.

Field Maintenance: Robot & OCU II

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The Throwbot XT robots and OCU IIs are designed to provide mission critical information in harsh or hazardous environments, but no product is indestructible. In order to ensure that your ReconRobotics equipment keeps performing as expected, please follow these steps after each use of the robot and OCU II.

Throwbot XT Robot Field Maintenance

Wheels: If the nut is loose, tighten the nut with a 5/16 inch nut driver. Do not over-tighten. The wheel should spin freely.

Stabilizing Tail: If tail is loose, use a 1/16 inch Allen wrench to tighten the bolts holding on the tail. Do not over-tighten.

The wheels and tail are not interchangeable between the Throwbot XT & Recon Scout robot models. Use the correct parts for your model of robot.

Antennas: Visually inspect for scuffing or cracking. If wire is exposed, antennas will need to be replaced.

The optimal arrangement of the antennas is sticking relatively straight up into the air with a slight slant toward each other. It may be necessary to manipulate the antennas into this position by making a sharp kink at the bottom of the antenna near the shell and straightening out any other kinks along the length of the antennas.

IR Blister: Lightly dust off the IR Blister to ensure the sensor is clear.

OCU II Field Maintenance

Antennas: Ensure that the antennas are not bent or kinked and that they are able to easily be rotated.

DO NOT DISASSEMBLE YOUR ROBOT OR OCU II. There are no user-serviceable parts inside.

ReconRobotics does not supply any repair parts except for what is available in a Field Maintenance Kit (FMK). Repairs or modifications, other than those associated with the FMK, which are not conducted by authorized personnel will result in the voiding of warranty and/or Annual Maintenance Plans. Refer servicing to qualified ReconRobotics service personnel. (See Warranty and Service, pg. 17)

Field Maintenance: Dual Charger

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The Connector piece on the Throwbot XT charger may accidentally detach when removing the charger from the robot. If this happens, it is essential that it be reassembled correctly in order to charge the robot properly.

Figure 2 below demonstrates how to align the red dot on the Connector with the oval channel on the inside charging pin. Connect the two pieces together in this configuration and the charger will continue to operate normally.

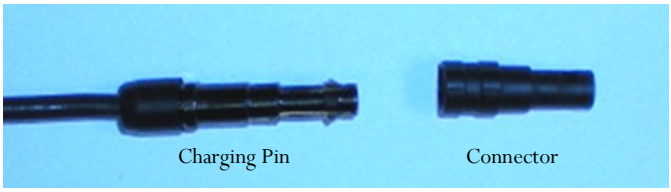

Figure 1: Components of robot charging system

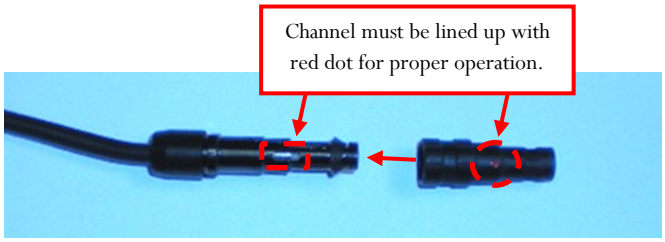

Figure 2: Correct alignment of red dot on Connector and channel on pin

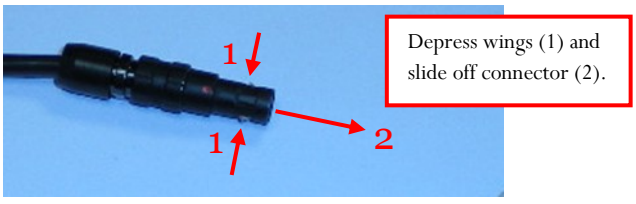

Figure 3: How to disassemble if realignment is needed

Please contact ReconRobotics Customer Service with any questions about this process. (See Warranty and Service, pg. 17)

Frequently Asked Questions

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How long will the robot run on a full charge?

The actual battery run time of a robot will vary depending on the time spent driving and the terrain the robot is crossing. On a fully charged battery, the robot should run for approximately 60 minutes.

How long will the OCU II run on a full charge?

The battery run time of the OCU II is approximately 120 minutes.

How many times can the robot and OCU II be recharged?

The robot and OCU II use Lithium Polymer batteries which are rated for 300 recharges before any degradation of capacity.

How long does it take to recharge the OCU II and robot?

The recharging times for the OCU II and robot are approximately one to three hours depending on the current state of charge and age of battery.

Can the robot be operated in wet conditions?

The OCU II should only be used in a dry environment. The warranty and Annual Maintenance Plan do not cover any damage resulting from exposure of the system to water, salt water spray, hazardous or caustic chemicals, etc.

The Throwbot XT robot is passively water resistant to a depth of one foot (30 cm) for up to five minutes.

Where can I find the serial numbers on my robot or OCU II?

Robot: Underside of shell, near the tail mounting point.
OCU II: Bottom of the back side, near the lanyard mounting post.
Format: Eight or nine digits with an alpha character in the fifth digit.

Troubleshooting

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I've been using the OCU II for an extended period of time. Now the screen is black when I power on, and I cannot control the robot.

For safety purposes, when the battery drops below a certain voltage, the OCU II deactivates itself. You will need to recharge the OCU II as described in the "Instructions for Use: Chargers" section (page 7).

I've turned the OCU II on, and the screen is not displaying a solid video stream.

"Bad" video can have several possible causes:

- The robot may be out of range.
- The robot may be low on power or deactivated.
- The robot or OCU II may be experiencing interference caused by environmental factors (e.g. other radio devices in the area or proximity to metal).

The charge indicator lights do not light up when the robot or OCU II is connected to the battery charger.

Refer to page 7 for instructions on how to read the indicator lights on your chargers. If you are still having issues, test for:

- Faulty power to the charger. Try powering the charger from another source.
- A general failure in the charger. If the problem persists after changing the power supply, contact ReconRobotics.

I have headphones plugged into my OCU II, but all I hear is static.

The OCU II will only transmit audio if you are using an active, audio-enabled Throwbot XT Robot on the same operational channel.

Troubleshooting (cont.)

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When I throw the robot, it does not drive straight when it lands.

The robot has electronic circuitry that needs to self-calibrate after a throw. When the robot lands, let it sit still for a few seconds before driving. It will automatically recalibrate itself during this time and should resume driving as expected.

The robot's IR light is not turning on.

The IR LED will not turn on if the light sensor detects sufficient light, in order to conserve battery life. If your robot's IR light does not turn on when the robot is in a state of complete darkness, there may be an issue with the light sensor.

The IR light stays on constantly, even in daylight.

If there is dust or debris present on the IR blister, the light sensor may determine the environment has less ambient light than it really does. Ensure that the IR blister is free of dust or debris by wiping it with a soft towel.

The robot or OCU II is not holding a full battery charge.

If you feel that your Throwbot XT robot or OCU II is not running for its complete battery life on a full charge, there is a simple self-diagnosis test you can run to check the performance:

- Fully charge your robot and OCU II (refer to page 7 for instructions). Start test by pulling pin from robot and turning on the OCU II. Record the time that the units are turned on. Run both units continuously until:
    a. Robot stops moving and sending video
    b. OCU II screen goes blank and stops sending commands.
- Record the time. Contact ReconRobotics for service if:
    a. Robot runs for under 60 minutes
    b. OCU II runs for under 120 minutes

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The Throwbot XT robot is not charging at all.

If the robot is not charging even when following all instructions on page 8, there may be a failure of the activation pin or charging system.

First, check the robot's activation pin to ensure that the magnet is still inset at the tip of the pin. If the magnet is missing, it will not be able to reset the robot. Use your kit's spare pin and contact ReconRobotics for a replacement pin.

Next, refer to page 10 for instructions on field repair of your dual charger. Ensure that the Connector piece is attached properly (if unsure, remove it and rotate 180 degrees according to the instructions).

How do I request service if I am still experiencing problems with my ReconRobotics equipment?

You can request service by contacting your ReconRobotics sales representative (refer to page 17). When you contact, please have the following information available:

1. Problem description
2. Customer agency
3. Contact name
4. Contact phone or email
5. Serial number of the product that is experiencing difficulties

Our technical staff will attempt to troubleshoot and resolve the problem. If repair service is needed, we will set up an RMA (Return Material Authorization) and arrange for shipment of your equipment to our US repair facility. Standard turnaround time for repair is under one week after receipt.

If your issue cannot be resolved remotely, ReconRobotics will provide loaner equipment for Throwbot XT kits during the repair process. We pay all shipping costs.

If your issue is not covered under warranty or by an extended service plan, we will provide a not-to-exceed (NTE) repair cost estimate for your approval before commencing repair. After repairs are complete, you will be invoiced for the actual cost of repairs up to this estimate.

When sending equipment in for RMA, please include the entire kit (Robot, OCU II and chargers) to ensure all necessary repairs can be completed.

Safety Information & Warnings

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Read these warnings before charging or using your robot or OCU. Failure to read and follow these instructions may result in fire, personal injury and/or damage to property.

Retain these instructions for future reference. To reduce the risk of injury or damage, keep these safety precautions in mind when setting up, using and maintaining your equipment.

- To reduce the risk of electric shock, do not remove the shell of the robot, Operator Control Unit (OCU) or the chargers. No user-serviceable parts are inside. Refer servicing to qualified ReconRobotics service personnel.
- Do not attempt to service the robot or OCU yourself. Repairs or modifications not conducted by authorized personnel will result in the voiding of warranty and/or Annual Maintenance Plans.
- Keep loose clothing and hair away from the robot.
- Considerations for charging:
  - Always charge the robot with the activation pin inserted.
  - Always keep the OCU turned off while charging.
  - Always charge in a cool, ventilated, fire-safe area.
  - Do not leave system unattended while charging.
  - Always use a proper country-specific AC socket (120-240 VAC) with the battery charger. Do not force the plug into a socket.
  - Ensure the charger plug is inserted at the correct angle when connecting to the robot or OCU.
  - Ensure the barrel of the charging connector is not deformed, bent or otherwise damaged before inserting in the robot or OCU.
- Lithium Polymer batteries are volatile. Only charge the robot and OCU with chargers provided by ReconRobotics. Failure to do so may cause fire, which could result in personal injury and/or property damage.
- By purchasing a robot kit from ReconRobotics, the buyer assumes all risks associated with lithium polymer batteries. If you do not agree with these conditions, please return the robot kit to ReconRobotics.

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- Do not attempt to disassemble or modify the robot or OCU. This may cause an electric shock, fire or system failure.
- Do not insert any foreign objects inside the robot or OCU. This may cause electric shock, fire or system failure.
- Do not immerse the OCU or chargers into water or liquids.
  - If water or any liquid enters the inside of the OCU, immediately stop use to avoid electric shock, fire or system failure.
- The following describes additional symptoms of a device that needs technical attention and should not be used:
  - After a full charge, the OCU display intermittently turns ON and OFF.
  - The OCU or charger has been dropped and is malfunctioning.
  - There are exposed wires on a charger cable.
  - The robot, OCU or charger becomes too hot to touch.
  - There is an unusual sound emitted from any of the components.
  - There is smoke emitted from any of the components.
  - There is a burning smell emitted from any of the components.

If you have questions or concerns regarding the use or operation of the robot or OCU, discontinue use and contact ReconRobotics or the vendor from whom you purchased your equipment.

Warranty and Service

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Warranty
The Manufacturer's Warranty documentation is available online at:
http://www.reconrobotics.com/warranty

Manual Translations
This manual is available in several languages online at:
http://www.reconrobotics.com/service/recon-scout_user_manuals.cfm

To Request Service or Repairs
Call or e-mail your ReconRobotics representative or reseller to describe the problem you are experiencing and request a Return Material Authorization (RMA) tracking number. In addition to your original sales receipt, you will need to provide the unit's serial number, your return shipping address, email address and a daytime telephone number.

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